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## SPECIAL ARTICLES



THE ACROPOLIS OF ATHENS  
PRESENT CONDITION

## THE CLASSIC ORDERS OF ARCHITECTURE

BY EGERTON SWARTWOUT, F.A.I.A.

*The following is the first of a series of articles on the classic orders which will appear monthly*

### I. INTRODUCTION

IT is universally accepted that the term Classic in architecture is limited in application to those temples and monuments which date from the best period of Greek and Roman art—a comparatively short period, as history goes, lasting in Greece only about one hundred and fifty years, from the time of the Persian invasion to the time of Alexander the Great, and approximately double that length of time in Rome, from the time of Julius Cæsar to that of Diocletian. That the monumental temples of Egypt and the palaces of Assyria and Persia are refused the distinction of classicism is possibly due to the fact that they did not appeal to the taste of the Renaissance writers, and possibly also to the fact that at that time they were comparatively unknown. Whether to this empirical classification can be attributed the general neglect of Egyptian art by the architectural profession, or whether this neglect has been due to a feeling that the Egyptian is less adaptable to modern purposes than Grecian or Roman, it is not within the province of this article to discuss; still, there is so much that is monumental in the Egyptian plans, interiors and methods of lighting, and so much that is fine in the simplicity of their orders,

that it is strange and to be regretted that no serious effort has been made to adapt—to the requirements of the present—a monumental grandeur that has never been equaled in the past.

It has been said that the history of a country can be read in its architectural remains, and this is preëminently true of Greece and Rome. The developments of the Doric temple from the crude forms of the Eighth Century to the marvelous proportions and subtle refinements of the Periklean age are coeval with the advancement of Greece in wealth and learning, as well as in the allied arts of painting and sculpture. The glory of Greece in commerce and in art was a gradual development from Mykenæan civilization, just as the squat columns and overwhelming entablatures of the early temples are the stepping-stones to the proportions of the Parthenon. This gradual development and ultimate perfection were possible in Greece to an extent achieved seldom in Rome and scarcely at all in modern times. The Greek architect was working along the simplest lines and with the simplest forms, and practically with one order, the Doric; and by all succeeding ages it is acknowledged that he alone of all architects has approached the

absolute. No one has ever built a better Doric exterior than the Parthenon, nor is it probable any one ever will.

If, then, it is true that the history of a country can be read in its architecture, how regrettable it is that we cannot read more thoroughly the history of that architecture itself! How regrettable is the almost total destruction of these ancient monuments, not so much by the ravages of time as by the ignorance and greed of man; and how equally regrettable is the fact that the written records of Classic Architecture are almost negligible! and it is because of the paucity of these records that we must needs build up our present-day knowledge of that architecture from the buildings themselves; and this knowledge must rise phoenix-like from the ruins, for, unfortunately, these monuments are in such a ruinous state that their restoration is not only difficult, but in some cases problematical or impossible. Of the older temples many have completely disappeared, and our knowledge of their existence is confined entirely to a few straggling inscriptions and to references in the works of early Greek and Roman writers. Others have been uncovered by the excavations in recent years, and there has been found only enough of the foundations and fragments of columns to make their restoration a source of contention among archæologists. In places the structure has been entirely overthrown by earthquakes, and nothing is left but a mass of weather-beaten stones, piled in confusion round the site; and in such cases as these it is almost an impossibility even to determine with exactitude the height of the order. Had the columns of antiquity been constructed in accordance with our modern method, with drums of equal height, their restoration would be comparatively simple; but with unequal drums the only method of arriving at this height is by a careful computation of the entasis, a method which on account of the flatness of the curve is difficult of application, and has on occasion resulted in divergencies of nearly two feet.

The extreme difficulty in taking accurate measurements under such circumstances can be appreciated by any one who has attempted to measure carefully buildings that are in a fairly completed condition. Almost invariably the drums that have been found are so weather-worn and broken that the only way that accurate measurements can be obtained is from the depth of the fluting and these measurements are naturally not as accurate in determining the entasis as those taken from the arris, for on account of the diminution in depth the line of entasis taken on the depth of the flutes is not the same curve as the entasis taken on the arris, and further, as the arris alone gives the outline of the column, usually less care is expended on the cutting of the depth of the flutes; and as even in the Parthenon none of the columns are exactly the same in size, a comparison of the entases of several columns becomes of questionable value.

Another disconcerting fact is the utter absence of any remains other than stone, or in some instances terra-cotta. The bronze and more precious metals have long since been stolen, and the wood, which formed a greater part of the roof and ceiling, has absolutely disappeared; and as in many of the very ancient temples it is probable that not only

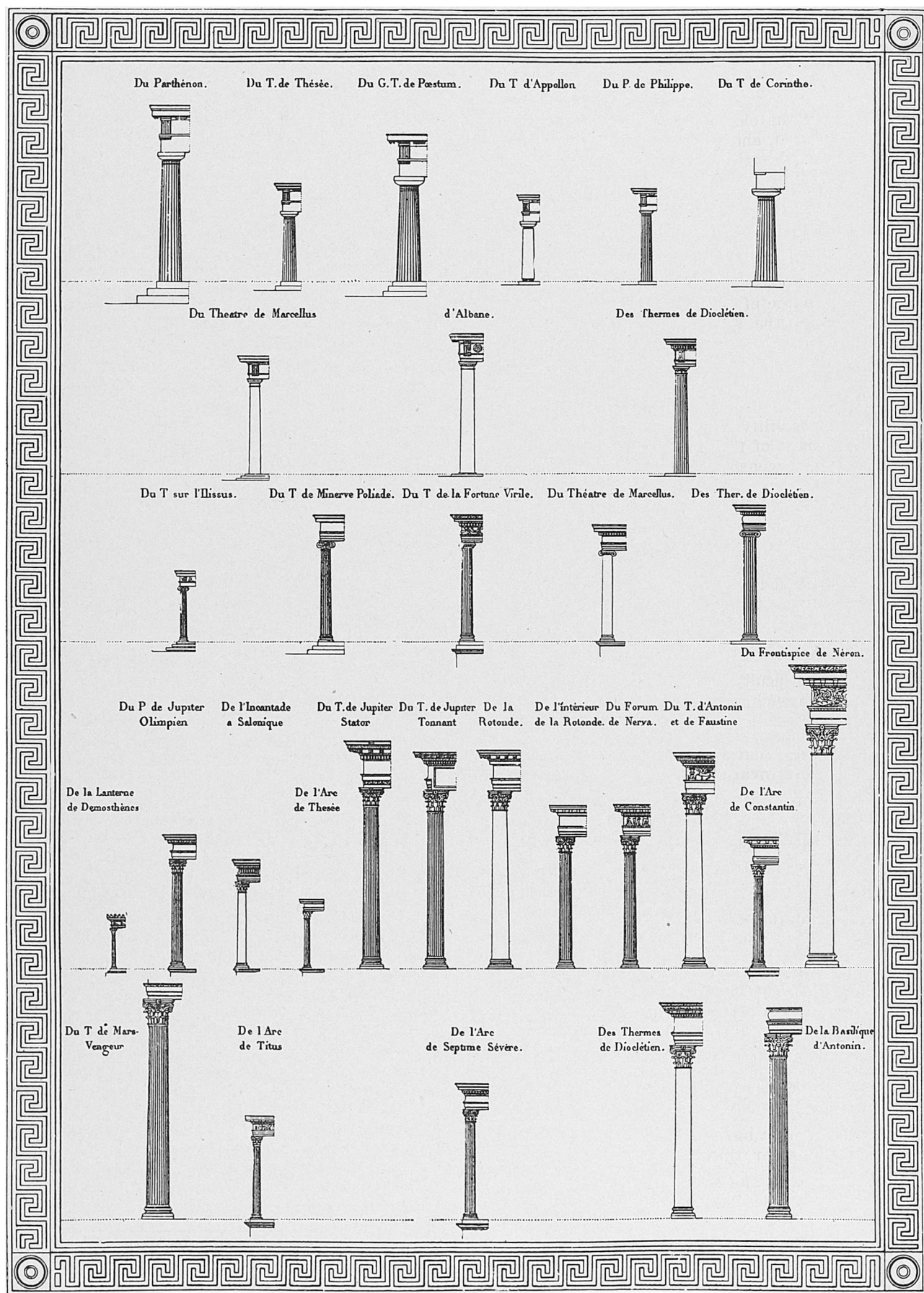
was the roof and ceiling of wood, but that also the entire entablature was formed of this material, any restoration becomes entirely a matter of conjecture and individual opinion.

Fortunately, much of the remains of the more important temples are standing, and their restoration can be accomplished with more or less certainty. From the measurements made by Penrose we can with confidence restore the columns, entablature and walls of the Parthenon, the Erechtheion, and the so-called temple of Theseus. Other monuments in Athens, as well as certain temples in Sicily and Magna Græcia can be restored with general accuracy. In no case, however, has there been a positive agreement as to the roofing and method of lighting, the latter especially having been the subject of greatest controversy for the last century and a half.

In this most interesting, but little-pursued, study of the remains of antiquity, a study which unfortunately has been confined chiefly to archæologists, two most regrettable facts present themselves, the first that until a few hundred years ago these monuments, especially in Greece, were in a fairly perfect state, and secondly, that there exists no contemporaneous description which can be followed as a guide in their restoration. We know that it was often customary for the architect to leave written records of the buildings he had erected. We know that Iktinos wrote a monograph on the Parthenon, and possibly on his extremely interesting temple at Bassai. There were descriptions of the Erechtheion and of the Propylæia and of some of the later temples, and yet none of these records have been preserved to us, with the exception of some inscriptions which refer to the cost and construction of the Erechtheion, and a fairly complete specification of an arsenal built much later in the Peiræos.

If we could imagine that the writings of Iktinos were personal records or that they covered in detail the now disputed points in the construction of the Parthenon; if we could imagine them his own account of his struggles and achievements, of his first conceptions of the work and of the changes that were undoubtedly forced on him by those in control; if we could learn at first-hand his reasons for the adoption of a proportion for his columns and his entablature slightly different from those of their prototypes, his ideas regarding entasis and the inclination of the column, his study of the lighting problem, and the extent of the color decorations, all this would make the most fascinating reading and would prove of incalculable benefit to the architectural profession now. The only consolation that is left to us is that these descriptions were probably impersonal; they may have dealt only with the history of the construction of the building, its progress and probable cost; in other words, they may have been merely reports which were submitted to the officials in Athens, similar in many respects to the reports submitted by architects of modern times. If this is the case, we can only feel that we have lost an interesting document, and not a priceless contribution to the literature of architecture.

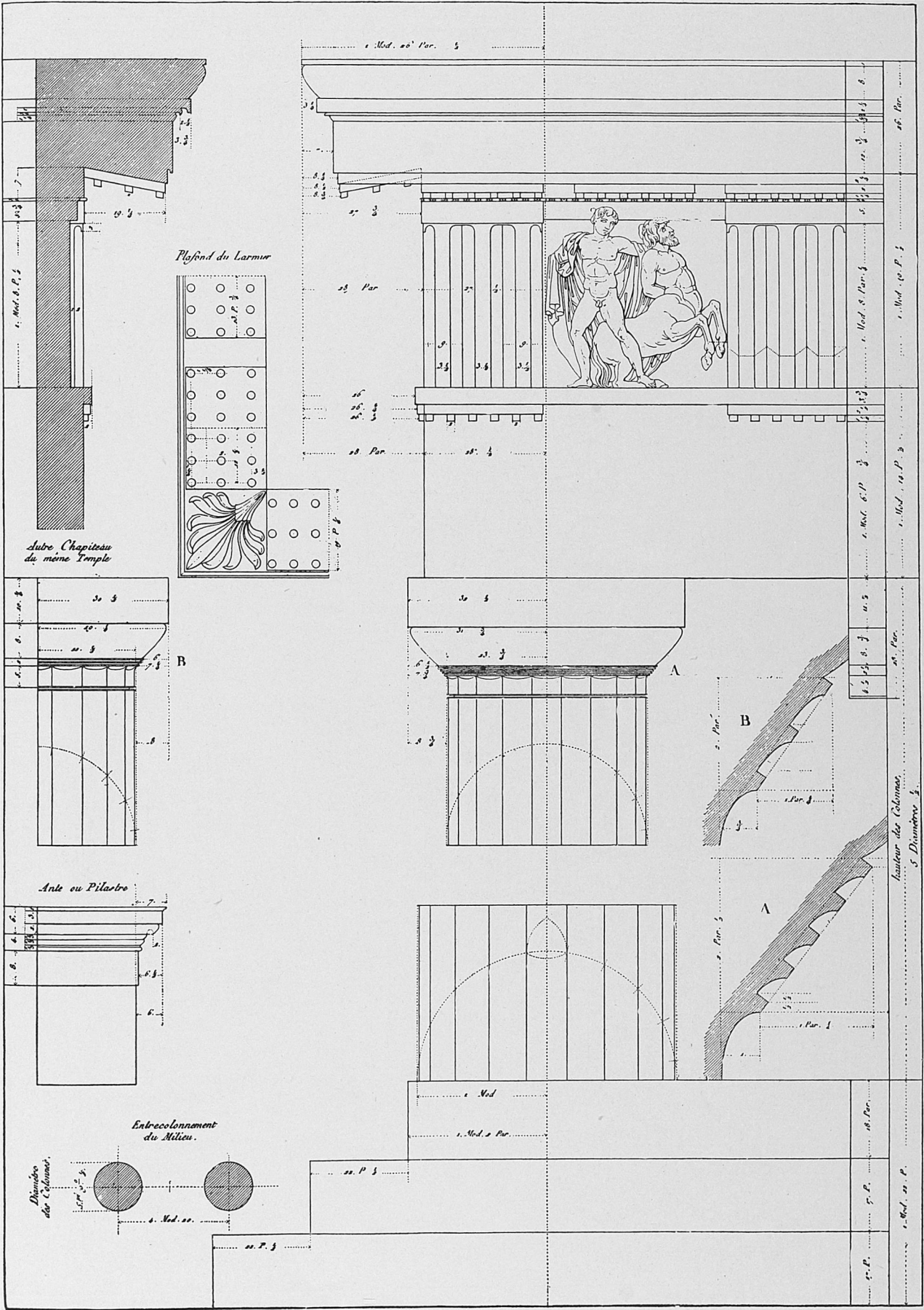
It is true we have an occasional reference to contemporaneous buildings in Herodotos or in the Greek poets of the Periklean age. These references, however, are slight, and have chiefly been used by archæologists to combat the views advanced



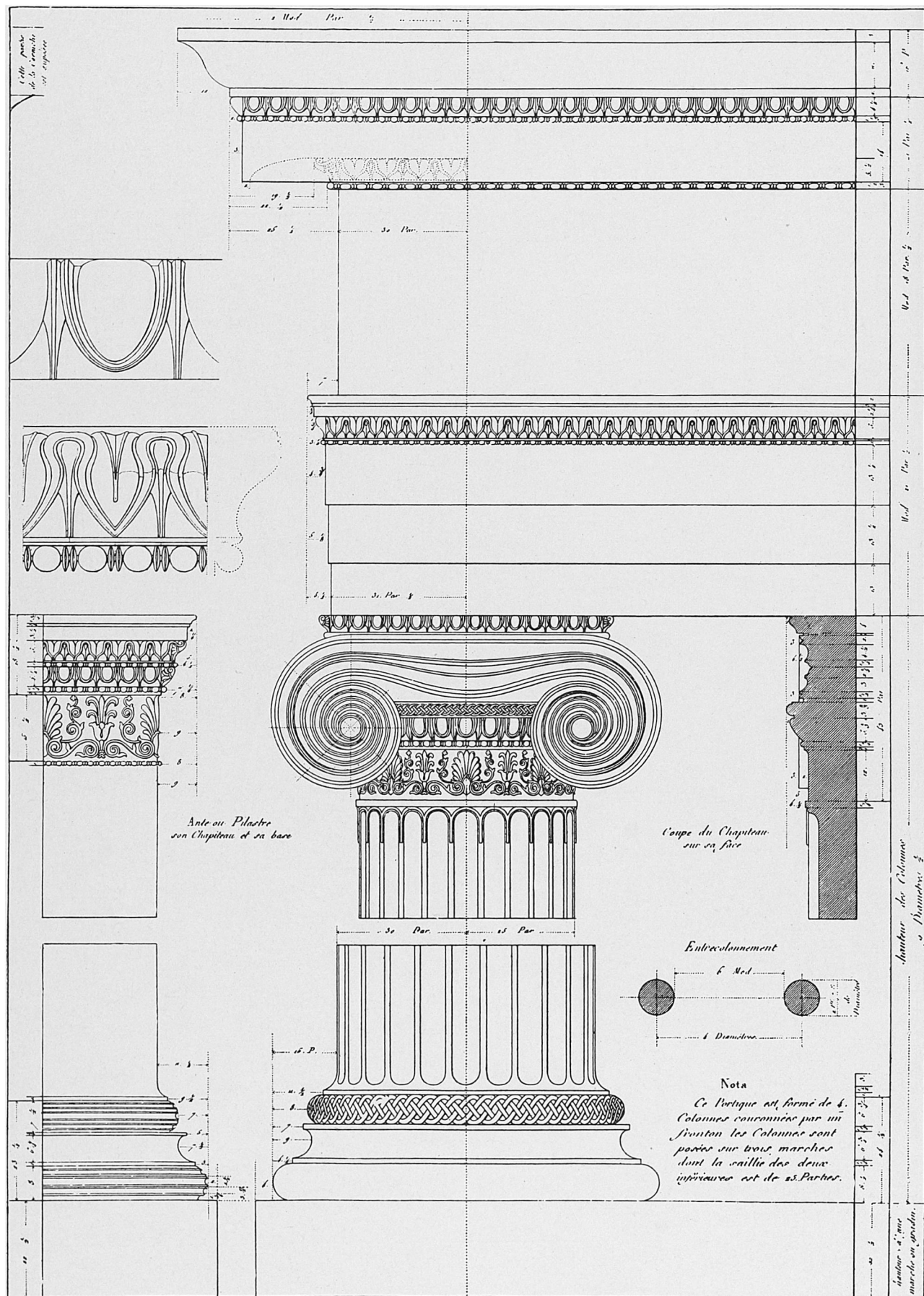
# PARALLEL OF THE CLASSIC ORDERS

SHOWING THE RELATIVE SIZES OF THE COLUMNS OF DIFFERENT WELL-KNOWN TEMPLES



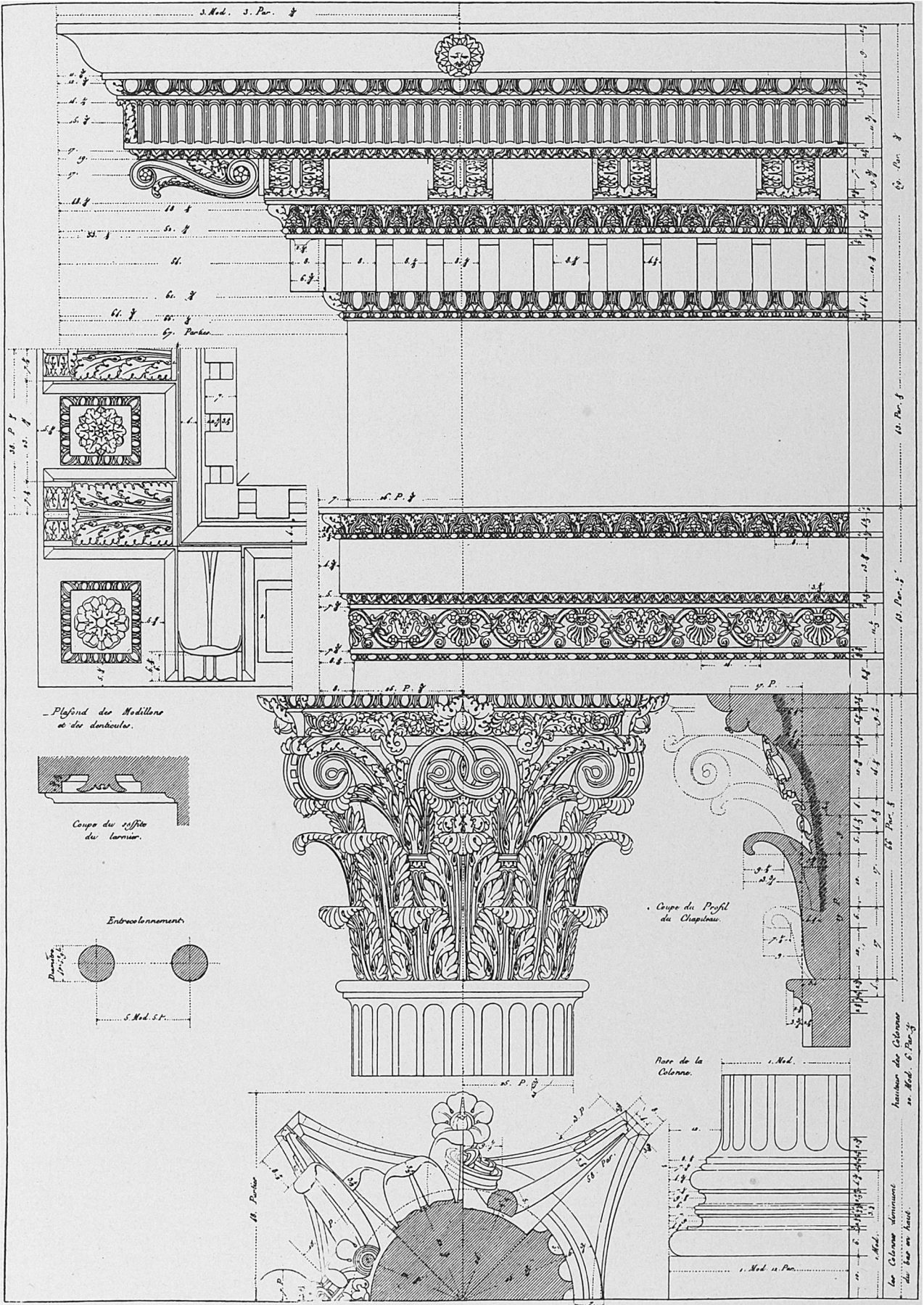


THE DORIC ORDER OF THE PARTHENON ON THE ACROPOLIS  
 THE MOST PERFECT OF ALL DORIC COLUMNS



THE IONIC ORDER OF THE ERECHTHEION TEMPLE ON THE ACROPOLIS

THE MOST BEAUTIFUL IONIC COLUMN EVER COMPOSED



THE CORINTHIAN ORDER OF THE TEMPLE OF JUPITER STATOR IN ROME  
 PERHAPS THE FINEST OF ALL CORINTHIAN COLUMNS



by some one else, and have no real architectural value. At a very much later date we have the writings of Pausanias, a Greek from Asia Minor, who in the time of Hadrian made extensive travels and observations throughout the then known world. He was not an architect, and although his observations of localities and buildings are valuable and interesting, they are not of very great service to the archæologist.

Practically the only classic author whose writings on architectural matters have come down to us and who was himself an architect was M. Vitruvius Pollio, who lived and wrote in the time of Julius Cæsar and Augustus, and is better known as Vitruvius, sometimes called the Father of Architecture. Vitruvius seems to have been more of an engineer than an architect; in fact he does not seem to have made much of a success at the latter profession, although his book is a palpable attempt to bring himself to the favorable notice of Augustus. This he admits, and instances the case of a Greek architect named Deinokrates, who was extremely anxious to attract the favorable notice of Alexander the Great, and "having divested himself of his garments, anointed himself with oil, and clad in a lion's skin, with a wreath of poplar on his head and an enormous club in his hand" created such a sensation that he was promptly awarded the commission to build the city of Alexandria. However, Vitruvius felt that this strenuous policy of the big stick was not suited to his physique for he says: "But to me, O emperor, nature hath denied an ample stature; my face is wrinkled with age and sickness hath impaired my constitution." Later, in Book VI, there is an indication of disappointment not unmixed with jealousy at his non-success, which he attributes to his high ethical standards. The passage is interesting because it shows that the modern method of obtaining work is a distinct inheritance: "But I, O Cæsar, have not sought to amass wealth by the practice of my art, having been rather contented with a small fortune and reputation than desirous of abundance, accompanied by want of reputation. It is true that I have acquired but little, yet I still hope by this publication to become known to posterity." "Neither is it wonderful" he says "that I am known to but a few. Other architects canvass and go about soliciting employment, but my preceptor instilled into me a sense of the propriety of being requested, and not of requesting to be intrusted, inasmuch as the ingenuous man will blush and feel ashamed in asking a favor."

His book is indeed a most remarkable production. He describes in detail how to lay out a city to take advantage of the most salubrious breezes, how to make ballistæ and other engines of war, how to apply stucco in damp places, and how to manufacture colors, how to lay out sun-dials, and what kind of water is best adapted to the cure of internal ills; and indeed, he has a great deal to say about water, for he says in Book VIII: "Some springs appear to be mixed with wine, as that in Paphlagonia, which when taken, inebriate as wine," and again: "In Arkadia, at the well-known city of Kleitorion, is a cave flowing with water, of which those who drink become abstemious." It is encouraging to know that there was an antidote, to which, however, the distance between Paphlagonia and Arkadia was somewhat of a deterrent.

Pursuing still further the same subject, he says: "On the contrary, in a champagne country much water will not probably be found"—although it may be that the aptness of the latter allusion is an unconscious contribution of Mr. Gwilt, the translator.

He then proceeds to give explicit and minute directions as to the proportions of a temple, the acoustics of a theater and the modular height of a column and its entablature. In its general range of information his book was not dissimilar from the "World Almanac"—an Augustan prototype of "Kidder's Handbook"—no Roman home was complete without it. And this is the book on which, in default of better authority, the architects of the Renaissance based their dogmatic ideas of Classic proportions! Everything was to be done according to rule, and there was a rule for everything. The module was king; and generally speaking, this idea has been adopted with more or less fervor ever since. If we wish to use an order in these days, it is quite customary to take a copy of the "Grand Vignole," and the thing is done.

Personally, I do not think that in the Classic period such things entered into the design of a temple, any more than I think Homer anticipated that some of his lines would be held to express ideas that I feel certain were never intended. Neither his poetry nor any one else's was composed by rule, notwithstanding Mr. Poe's contribution. Πολυφλοίσβοιο θαλάσσης was written without a thought of onomatopœia, and only because it was a beautiful expression. Similarly Iktinos developed the subtle proportions of his architecture, not by rule or by module, but by years of study of what had been done and patient effort to improve on the masterpieces of the past. A module is unquestionably a valuable method by which to express columnar measurements, because, being in terms of the lower diameter, or, as some prefer, the mean diameter of the column, it is capable of application in showing proportion without regard to actual linear dimensions. Naturally a careful investigation into these modular dimensions will develop certain mathematical proportions which can be carried to an almost infinite degree, as may be seen in the remarkable tables published by Mr. Watkiss Lloyd in connection with Penrose's measurements. Speaking of these proportions established for the temple at Priéné, Mr. Letheby says: "They are monuments of pure mathematics, their only inaccuracy being in the data on which the calculations are based." In other words, aside from the fact that they are based on measurements which were afterward proved wrong, they are perfectly good proportions.

In modern times there have been numerous extremely valuable contributions to the literature of Classic Architecture, and roughly, these contributions can be divided into two classes, the first consisting of restorations intended to show, by means of carefully engraved plates or half-tone reproductions of renderings, just how the temples of the immortal gods probably looked. Some of these, as Penrose says, are done with extreme care and are trustworthy. Others, unfortunately, seem influenced more by the imagination of the restorer and by his anxiety to make a fine *rendu* than by actual facts or exhaustive study. In the second class may



be included the various histories of architecture and of art, and monographs relating to the latest excavations and discoveries. These publications are many and valuable, and in most cases authoritative, but unfortunately they are not consulted by the modern architect after he has left the classroom, and oftentimes not even in the class-room, while plates of Buhlmann and Normand, and the wonderful restorations in D'Espouy, and the works of our old friend of Vignola, are in most architects' offices, and are continually subject to painful search and unscrupulous and indiscriminate copying.

Personally, I am a most profound admirer of Classic architecture, and I would be the last one to regret the publication of these books, to underestimate their value or to criticise their use. What I do criticise and sincerely regret is their indiscriminate and unintelligent use. It is of the greatest possible advantage to us to know what the ancients did, how they used the Orders, and why they did certain things under certain conditions. If we had not this knowledge, we would be under the necessity of attempting to develop new orders of architecture of our own. Gaining nothing from the experience of the past, we would be led into the wildest vagaries, and our architecture would rival the atrocities of cubism and futurism.

But the great trouble with the books that we have is, that in few of them is there any indication of why things were done. We either find some elaborate plates showing one man's idea of Classic Arch-

itecture, or we find a certain rather dry account of excavations and their results, speculations as to the possible antiquity of certain remains, and how they were placed in reference to certain other fragments which have been discovered; but there is no attempt, or scarcely none, to explain the real principles which governed the Greeks and Romans in the development of their architecture. There seems to be no attempt on the part of the author to try to put himself in the position of the designer of the building and to work out the reasons which probably led him, under certain geographical or climatic conditions, to do certain things. This seems not to have been attempted by any of the restorers who were architects, and is naturally impossible to the archæologist who is not himself an architect. Even though he may have acquired a certain technical knowledge of architecture, he lacks the imaginative qualities which are a necessity to the real architect and designer, and can, therefore, only state his facts and prove his dates; and it often happens that some of his ideas of restoration, although possibly justifiable from an archæological point of view, are ridiculous from the point of view of design. I have always hoped that the fruitfulness of this field would be realized by some experienced architects who had leisure enough to devote themselves to a long and exhaustive study of these problems, and it is with the hope of arousing some interest in this field that this series of articles has been written.

*Egerton Swartwout*

*(To be continued).*

## THOMAS EAKINS

BY WILLIAM SARTAIN

*(See page 292)*

THOMAS EAKINS was born in Philadelphia July 25th, 1844. Graduating from the Philadelphia High School the year before the Civil War, he commenced the study of art at the Pennsylvania Academy of Fine Arts. After several years he was sent over to Paris to complete his studies and entered the studios of Léon Gérôme at the École des Beaux Arts. I was his intimate friend from twelve years of age at grammar school, college and the Pennsylvania Academy, and later I joined him in Paris where we had many friends in common, meeting Rosa Bonheur, Le Comte de Nouy and Dagnan-Bouveret in constant intercourse. When near the end of his Paris studies, just before the Franco-Prussian War of 1870, Eakins and his classmate, H. Humphrey Moore, went for a six months' sojourn to Seville. I joined them there shortly afterwards, and if little completed work is to be shown for our painting there, we had an inspiring study of the great Spanish art, and many fine excursions on horseback, including one of nine days to Ronda and the wilds of Andalusia. Shortly after our return to Paris, Eakins went back to America to practice his art in Philadelphia.

Fond of rowing and sailing and interested in athletics, he made a number of racing and hunting pictures as well as boxing contests. One of these he sent over to me in Paris which I showed to Gérôme, who highly praised it. I then took this

painting to Goupil, who immediately purchased it. Yet it was some time after this before he ever sold any of his paintings in America.

Having always been a very serious student, he remained as much interested in this as in producing pictures. No one was more devoted to anatomy, dissecting many subjects and interested in all the scientific problems connected with art. He was sincere and exact in his rendering of form and movement, and in these essential studies interested the numerous students that gathered round him. For over a score of years he taught painting and sculpture in life classes—first in the Pennsylvania Academy of Fine Arts and afterwards in his own school, as also in the Brooklyn Art Students' League and the Brooklyn Guild, and lectured in Philadelphia and New York on anatomy and perspective.

On his more particularly specializing as portraiture, his most important subject was the "Dr. Gross' Clinic," a most notable work, which, however, the Pennsylvania Academy of Fine Arts would not hang. About this time the Society of American Artists was formed in New York. La Farge, who had been badly treated in the Academy exhibitions, Samuel Colman, George Inness and other National Academicians were among the founders. To its first exhibition Eakins sent his "Dr. Gross' Clinic" and it produced a profound impression. This exhibition was such a decided success that the